# Update: WTC Dust Screening Method

U.S. EPA Office of Research and Development and U.S. EPA Region 2

WTC Technical Expert Panel Meeting July 12, 2005

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#### **Outline**

- Recap of Hypothesis
- Overview of Study
- Sample Preparation
- Study Design
- Results
- Preliminary Comments
- Summary
- Next Steps

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# Hypothesis for WTC Collapse Screening Method

- If a unit has been impacted, those materials that are found in WTC dust (markers) will be found in the dust collected from the unit. The materials under consideration are:
  - 1) slag wool (less than 2% iron)
  - 2) elements consistent with concrete
  - 3) gypsum

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### Hypothesis for WTC Collapse Screening Method

- Since slag wool is a major component of WTC collapse dust, if a sample does not contain 'significant' levels of this marker, the unit would not be considered to contain WTC residuals.
- The other markers would be used as a secondary confirmation of the presence of WTC dust i.e. they must be present for the slag wool to be attributed to the WTC collapse.

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### Overview of Study

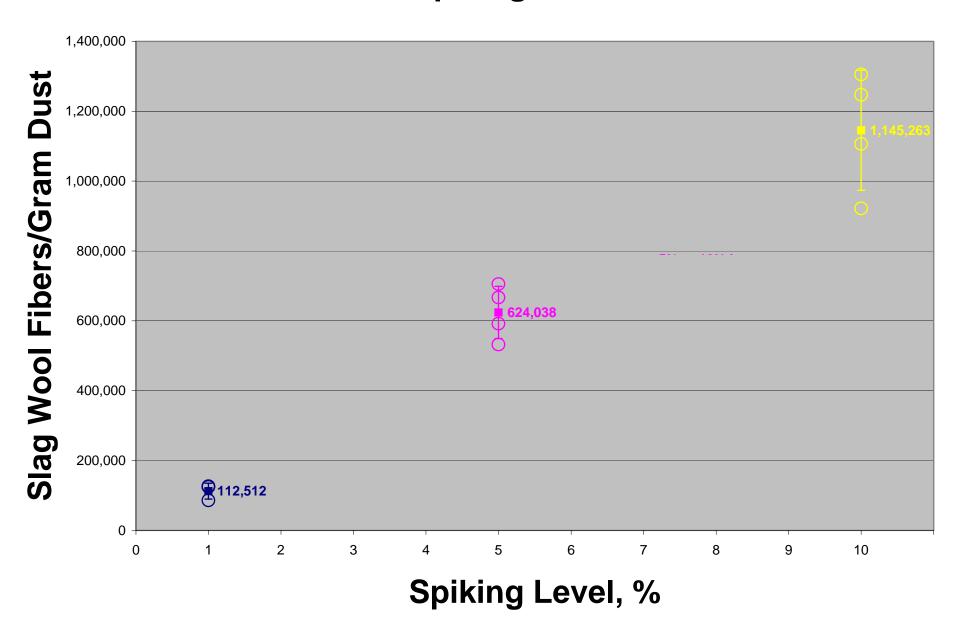
- Obtained samples of WTC dust and dust from locations that have not been impacted by the WTC collapse i.e. 'background'.
- Developed and standardized analytical methods for slag wool, gypsum, and elements of concrete.
- Prepared samples of 'background dust' spiked with known amounts of WTC dust and confirmed content of spiked samples.
- Had seven laboratories analyze 6 spiked samples and 10 background samples. One laboratory analyzed 28 remaining background samples that had been collected.
- Data is undergoing final analysis.

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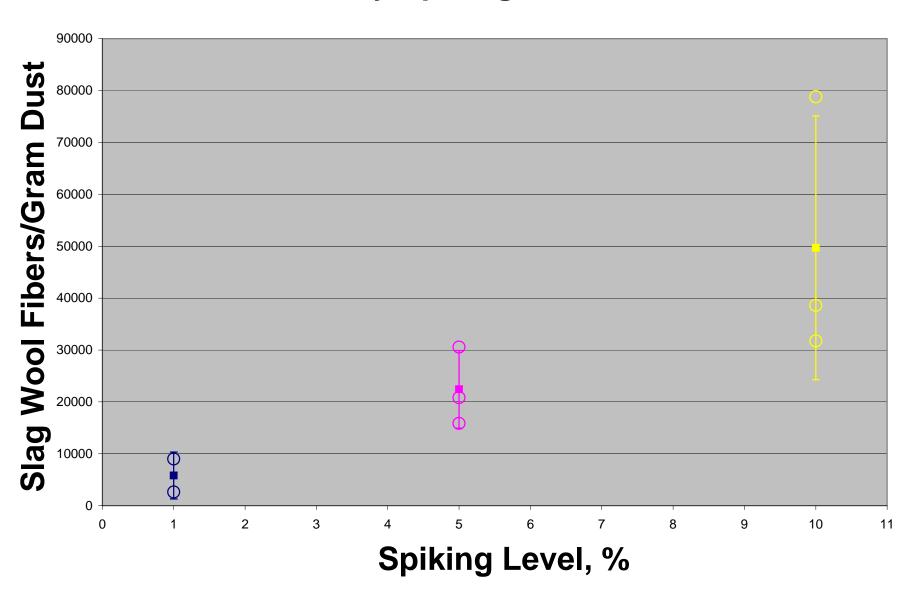
### Sample Preparation

- WTC dust was spiked into known background dust at three level (1, 5, 10%) and homogenized.
- USGS performed analysis of the spiked samples prior to being sent to labs.
- The spiked samples showed varied levels of slag wool; this was expected due to the difficulty in homogenizing dust containing large fibers, and the fact that components of WTC dust will vary within a sample because of the nature of the source.
- Despite this variability, the measured levels were in the approximate range expected for the spiking percent (1, 5, 10%) and, in all but one case, each percent level was distinguishable from the other.

#### **USGS Spiking Material**



#### **4 Albany Spiking Material**



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## Study Design

- Five commercial labs and two government labs (EPA and USGS) conducted the validation study.
- All labs received 32 blind samples.
  - 10 background samples and duplicates
  - 6 WTC dust dilutions (2 WTC samples) and duplicates
  - One lab received an additional 28 background samples for analysis
- Labs used the final protocol to analyze the samples.

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### Study Results

- Two labs have provided incomplete or flawed data (outside of the 95% confidence interval for all points). These data are not considered in these results.
- All background samples considered in these results are from the Greater NY City Area; background samples from NC are not included.

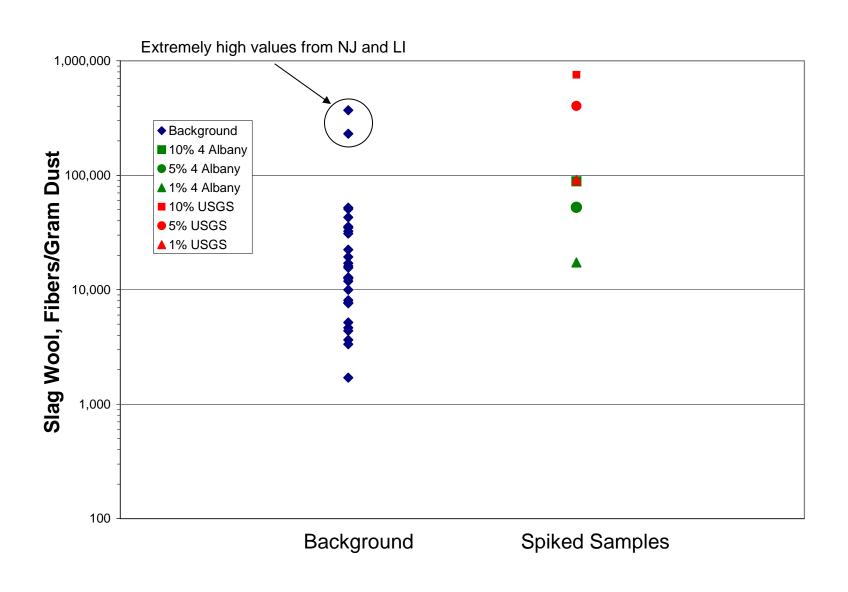
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## Study Results

	Background (Greater NY Area)	USGS Spiked (Collected 9/01)	4 Albany Spiked (Collected 9/04)
Slag Wool Average (fibers/g dust)	AVG <u>+</u> SD 36,500 <u>+</u> 75,000 18,000 <u>+</u> 15,000 * Range of Samples	<b>1%</b> 91,000 <u>+</u> 276 <b>5%</b> 402,000 <u>+</u> 174,000	<b>1%</b> 17,000 <u>+</u> 5,200 <b>5%</b> 52,000 <u>+</u> 8400
	ND - 370,000 ND - 44,000*	<b>10%</b> 755,000 <u>+</u> 245,000	<b>10%</b> 88,000 <u>+</u> 8,700
Elements of Concrete (% Area)	AVG <u>+</u> SD  19 <u>+</u> 7  Range of Samples 6 - 31	<b>1%</b> 19 <u>+</u> 1 <b>5%</b> 21 <u>+</u> 1 <b>10%</b> 19 <u>+</u> 1	1% 23 ± 3 5% 20 ± 3 10% 21 ± 4
Gypsum (% Area)	AVG <u>+</u> SD  10 <u>+</u> 4  Range of Samples 4 - 19	<b>1%</b> 9 <u>+</u> 0 <b>5%</b> 8 <u>+</u> 1 <b>10%</b> 9 <u>+</u> 0	<b>1%</b> 10 <u>+</u> 2 <b>5%</b> 9 <u>+</u> 2 <b>10%</b> 10 <u>+</u> 2

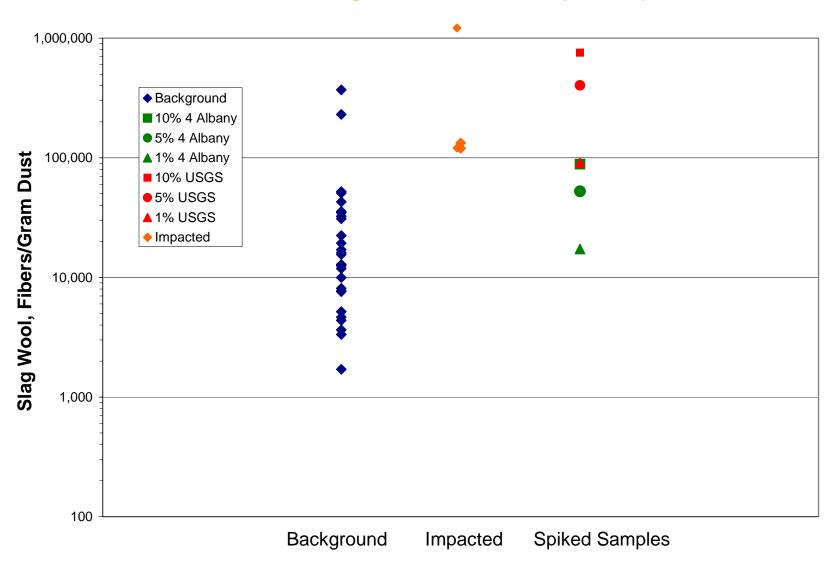
<sup>\*</sup> Removing two extremely high values from NJ and LI

### Slag Wool Results

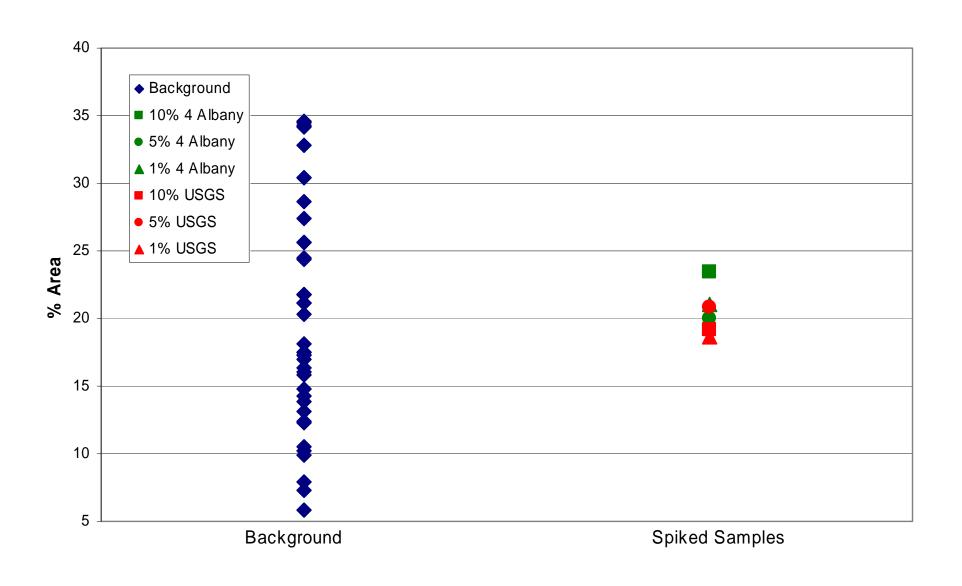


#### Slag Wool Results

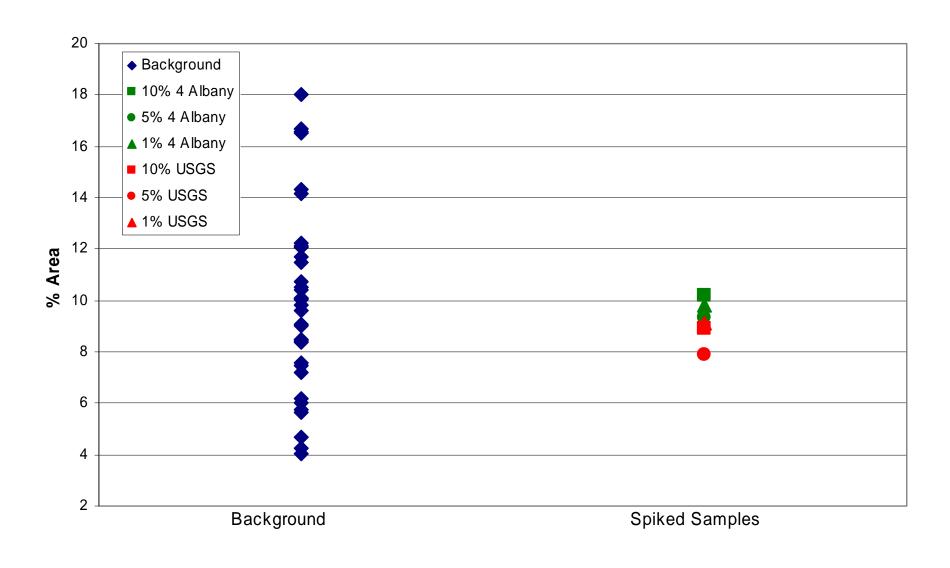
(Including Preliminary Data Collected from Impacted Locations During Method Development)



#### Elements of Concrete Results



## **Gypsum Results**



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#### **Preliminary Comments**

# Q: Does slag wool (defined as containing <2% iron) appear to be a good screening tool for WTC dust?

- Pure WTC dust collected by USGS during Sept of 2001 contained concentrations > 10,000,000 fibers/g in multiple samples and analyses.
- Deutsche Bank samples at 130 Liberty and 4 Albany had concentrations ranging from 500,000 fibers/g to 11,000,000 fibers/g in multiple samples and analyses.
- Greater NYC area background samples (many sites/samples) averaged about 36,000 fibers/g.
- 10% spiked Deutsche Bank samples (collected in Sept 2004) > 80,000 fibers/g.

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### **Preliminary Comments**

Q: Are gypsum and elements of concrete good secondary screening tools for WTC dust?

 There does not appear to be a distinguishable difference between levels of concrete and gypsum in background and WTC dust

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### **Preliminary Comments**

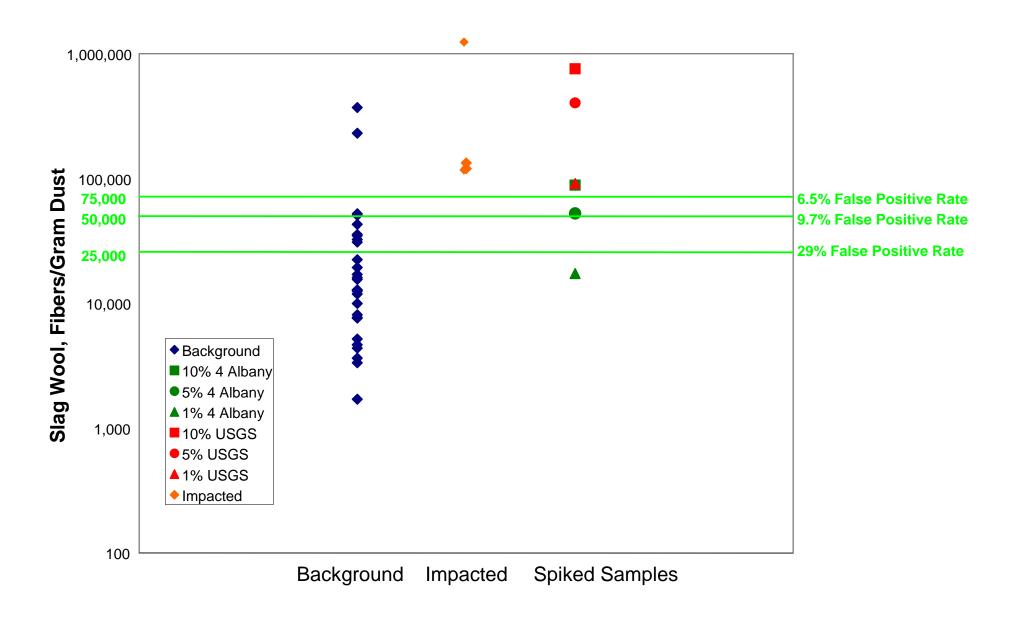
Q: What does the data say about within and between lab variability?

- There is high variability within labs as demonstrated by duplicate analysis of same sample in same laboratory (up to 55%).
- There is high variability between labs as demonstrated by analysis of split samples (up to 70%).
- Likely sources of variability:
  - Procedures to homogenize a sample did not result in 'uniform' distribution of fibers. Thus, the samples received are variable in content.
  - As some analytical interpretation is required, analysts with more experience are likely to provide better quality data than those with less experience.

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### **Preliminary Comments**

- Q: Given these results, specifically on slag wool and variability, can a WTC Dust Screening Method be based on slag wool alone?
- A limit could be established for slag wool that would ensure minimal or no false negatives, while keeping a reasonable level of false positives.
- Any unit showing a slag wool level above this limit, as well as a COPC exceedance, will be offered a cleaning.
- A false positive is a slag wool measurement above the limit from a location not affected by WTC dust.



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#### Summary

- Slag wool appears to be an indicator for WTC dust. A limit for this material could be established for screening purposes Elements of concrete and gypsum have little correlation with level of WTC dust.
- Within lab and between lab variability was high.
- Despite this variability, the method (using slag wool) appears to be sensitive enough to distinguish 10% WTC dust from background.
- Most labs were able to complete the work in a reasonable timeframe.
- Additional evaluation of the data will be performed to understand variability, and suggestions will be made to reduce variability in the future.

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#### **Next Steps**

- Study design and results are being subjected to external peer review by independent experts who have not been involved with the program.
- Expert panel will also be reviewing the study results.

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#### **Next Steps**

- Based on comments from the panel and peer reviewers, a decision will be made as to the validity of the screening method and its potential for success in determining residual WTC dust contamination.
- Once panel and reviewer comments are received, a slag wool limit will be decided based on comments, data and variability findings.